(5) constant attention to collections of water in gardens of houses and bungalows. In addition the segregation of Europeans was carried out to a limited degree, removing them from the vicinity of infected natives, treatment of all infected persons with quinine and the prophylactic use of quinine, the troops being paraded twice a week for this purpose. The results obtained were a distinct but not great diminution in the number of Anopheles present in the houses, and a diminution in the admission rate for ague to 269 per 1000, the lowest rate on record (1902 happened to be, however, an exceptionally healthy year). Captain James concludes that mosquito destruction, even though not obviously reducing the number of Anopheles, brings about a decrease in the amount of malaria, but is difficult to carry out and is expensive; apparently the campaign against the mosquitoes at Mian-Mir was not nearly so successful as that in Lagos. He attributes great value to the other measures, viz. the continued and systematic treatment with quinine of the native children, who are undoubtedly the chief source of infection, and the prophylactic use of quinine.

R. T. HEWLETT.

M. HENRY PERROTIN.

THE cause of astronomical science in France has been deprived of another of its ablest advocates by the lamented death of M. Perrotin, the director of the observatory at Nice. For more than twenty years M. Perrotin has watched over the growth and directed the energies of that institution. It was his good fortune, through the munificence of M. Bischoffsheim, to be able to erect and arrange a well equipped observatory to his own design, unhampered by legacies from former benefactors or directors. How the work grew under his hand astronomers have long since recognised and appreciated. As each instrument was completed it was immediately devoted to some special purpose. The meridian instrument was employed to determine the difference of longitude between Paris and the observatory, and to complete the chain Paris-Nice-Milan long before the observatory was in working order as a whole. The fifteen-inch equatorial was at work on double stars, planetary markings, comets, &c., before the large instrument of thirty inches aperture, under the mammoth "floating dome," could be devoted to the more rigorous scrutiny of faint and difficult objects.

It is scarcely necessary here to direct attention to the industry that marked the career of the first director of the Nice Observatory, or to the value of the researches produced by the staff under his guidance and encouragement. The work of M. Thollon on the solar spectrum may serve as a specimen in the department of spectroscopy. The discovery of many minor planets shows the care with which the photographic plates were taken and scrutinised. More particularly as the work of M. Perrotin, personally, should be mentioned his discussion of the inequalities in the orbit of Vesta, a research to which he devoted much time, interrupted as it must frequently have been by the care of the establishment under his charge. As an observer he was indefatigable, and devoted much time to the study of the faint markings on Venus, on Mars, and on Uranus. Aware that he was working at the extreme limit of visibility, and knowing the tendency for self-deception to creep in and impair the value of such delicate observations, he sought opportunities of making similar measures and records with different instruments, and under varied conditions, in order to remove, so far as possible, the evils of bias and partiality from the results of his researches. Excessive and painstaking care marked his efforts to secure rigorous accuracy.

Apart from his astronomical work, properly so called, in the department of physics, he added another determination to those that have been made on the velocity of light, which we recall here mainly to show the varied character of his researches and the energy which he displayed in whatever he undertook. His life was a busy one, and he did not spare himself. The great monument that he has left behind is the magnificent observatory at Mont Gros, and his greatest service to science is perhaps the activity which he inspired in those by whom he was surrounded. At the comparatively early age of fifty-eight he has succumbed, but he leaves behind him a memory that will be long treasured by all those whose fortune it has been to assist him in earning the reputation that the young observatory at Nice has already won.

NOTES.

THE Croonian lecture of the Royal Society will be delivered on March 24, the subject being "The Chemical Regulation of the Secretory Process," by Prof. E. H. Starling, F.R.S., and Dr. W. M. Bayliss, F.R.S. The Bakerian lecture will be delivered during May by Prof. E. Rutherford, F.R.S., of Montreal, on "The Succession of Changes in Radioactive Substances."

THE annual inspection of the National Physical Laboratory by the General Board will be held to-morrow, March 18.

PROF. OSTWALD will deliver the Faraday lecture of the Chemical Society on April 19 in the theatre of the Royal Institution.

PROF. AGASSIZ has been elected a foreign associate of the Paris Academy of Sciences in succession to Sir George Stokes; and Prof. E. Warming, Copenhagen, has been elected a correspondant of the academy.

SIR ARTHUR RÜCKER will deliver the academic address at the close of the present session at the University College of North Wales, Bangor.

DR. ROBERT LUTHER has been appointed professor of physical chemistry at the University of Leipzig.

THE deaths are announced of Dr. Wilhelm Schnell, professor of mechanics and synthetic geometry at the Technical School of Carlsruhe, and of Dr. von Pallich, assistant in physics and director of the meteorological station at the University of Graz.

THE Belgian Royal Academy has awarded its gold medal of 1000 francs to M. Marc de Selys-Longchamps for his memoir on the development of a Phoronis. The Théophile Gluge prize for physiology has been awarded to Dr. P. Nolf, of the University of Liège.

THE following have been elected associates of the Belgian Royal Academy (Classe des Sciences):—Profs. George Howard Darwin (England), Corrado Segre (Turin), Wilhelm Roux (Halle-sur-Saale), and M. Michel Lévy, of the French Geological Survey.

THE foundation of Schnyder von Wartensee offers, says *Science*, its prize of about 140*l*. for an essay on the climate of Switzerland during the last thirty-seven years. Essays, which may be in English, should be sent before September 30, 1906, to the library at Zurich.

A REUTER message from Rome reports that at 5.30 a.m. on March 10 a very violent earthquake shock, followed by four others, was felt at Magliano di Marsi. On the same day two earthquake shocks were felt in the neighbourhood of Botzen, in the southern Tyrol, in consequence of which a large landslip occurred.

THE council of the Society of Arts will proceed to consider the award of the Albert medal for 1904 early in May next, and members of the society are invited to forward to the secretary, on or before April 2, the names of such men of high distinction as they may think worthy of this honour. The medal was struck to reward "distinguished merit in promoting arts, manufactures, and commerce."

A REUTER message from St. Petersburg states that a scientific expedition, organised by the Russian Ministry of Finance, will leave there for Abyssinia within the next few days. The expedition will be under the leadership of M. Kournakoff, mining engineer, and its object will be to explore the auriferous districts near the source of the White Nile.

THE following are among the lecture arrangements at the Royal Institution, after Easter:—Prof. L. C. Miall, three lectures on the transformations of animals; Mr. L. Fletcher, three lectures on meteorites; Mr. H. F. Newall, two lectures on the solar corona; Prof. Dewar, three lectures on dissociation; Mr. H. G. Wells, two lectures on literature and the State; and Sir W. Martin Conway, two lectures on Spitzbergen in the seventeenth century. The Friday evening meetings will be resumed on April 15, when Monsignor the Count vay de Vaya and Luskod will deliver a discourse on Korea and the Koreans. Succeeding discourses will probably be given by Dr. P. Chalmers Mitchell, Prof. E. Rutherford, H.S.H. the Prince of Monaco, Prof. S. Arrhenius, and other gentlemen.

WE hear from Stockholm of the death of the well-known zoologist, Prof. Fredrik Adam Smitt, which took place on February 19. Born on May 9, 1839, at Halmstad, he took his doctor's degree at Upsala in 1863, and became docent in zoology at that university. While in this position he joined Torell and Nordenskjöld in their expedition to Spitsbergen in 1861, went with Nordenskjöld's expedition to Beeren Island and Spitsbergen in 1868, and accompanied the frigate *Josefine* on her voyage to the Azores, England and North America in 1869. On the death of Prof. Sundevall in 1871, Smitt, though only thirty-two years old, was appointed to succeed him as professor and intendant at the natural history museum of the State. Smitt wrote several papers on marine Invertebrata, notably Bryozoa, but it is for his work on fish that he is best known, especially for his critical list of the Salmonidæ in the State museum. Of late years he paid much attention to the gobies. His scientific knowledge was freely bestowed in attempts to help the Swedish fisheries.

AT the annual meeting of the Association of Chambers of Commerce last week, it was resolved that the Government should be urged to grant early facilities for the passage of the Bill for compulsory adoption of metric weights and measures throughout the United Kingdom. A resolution was approved supporting the motion recently adopted by the Royal Society with regard to the position of science in higher education, and directing attention, in view of the competition with other countries, to the vital importance of a knowledge of science being recognised as an essential part of general education. After a discussion on Patent Law, it was agreed that "this association, whilst welcoming the instalment of reform secured by the Patent Law Amendment Act of 1902, is of opinion that further amendment is needed in order to secure the forfeiture of all foreign owned patents for inventions and designs workable in this country, which are not so worked within a reasonable limit of time."

IN the House of Lords on Tuesday Lord Barnard directed attention to the report of the Departmental Committee on British Forestry, and asked the President of the Board of Agriculture and Fisheries whether the Government proposed to take any, and, if so, what, steps to give effect to the recommendations of that committee on the subject of education, instruction, and training in forestry. In reply, the Earl of Onslow said that the Board of Agriculture proposed to act on the recommendations of the departmental committee. On Mr. Stafford Howard's initiative the first steps in that direction had already been taken. Without any assistance from the Treasury a school of forestry had already been established by the Commissioners of Woods and Forests in the Forest of Dean. Again, through the agency and assistance of the Office of Woods and Forests, the Scottish Office had entered into communication with certain Scottish landowners to secure suitable areas for planting. The Treasury had been approached by the Board of Agriculture, and had promised assistance in the foundation of at least two forestry schools in England. Where these schools would be established he could not yet say; but applications had been received from many colleges, and from the University of Cambridge. He had been considering whether the University of Cambridge should not have the first claim to the attachment of a school of forestry; but no decision could be arrived at until the Secretary of State for India had decided what was to be the future of Coopers Hill College. His desire was to establish the two schools in different localities—one for the training of young men who were likely to become landowners or land agents, and the other for woodmen. The former he should prefer to see attached to one of the great universities.

THE Survey Department of the Ministry of Public Works at Cairo has published its meteorological report for the year 1901. It includes hourly meteorological observations at Abbassia Observatory, with seismological and magnetic observations, monthly and yearly means at a number of second order and climatological stations, and ten years' means, 1891–1900, for Wadi-Halfa. Most of the stations send telegraphic reports, from which a daily weather report is prepared and circulated, including data from several Mediterranean stations.

THE Danish Meteorological Institute has issued, as in previous years, an abstract from its nautical-meteorological year-book showing the state of the ice in the Arctic seas during 1903. The conditions are shown on five charts, for the months April to August, and the particulars are discussed in Danish and English text. The conclusions drawn are (1) that about the normal amount of sea-ice from the Polar Sea entered the temperate seas; (2) that the Labrador current brought an unusual number of icebergs with it in 1903; (3) that there is no indication that the appearance of icebergs east of Newfoundland will be more frequent than usual in the year 1904.

THE activity of the Faraday Society has given a fresh impetus to our contemporary the *Electro-chemist and Metallurgist*, which is now the official organ of the society. The current number contains a report of the proceedings at the February meeting, at which M. Hollard's interesting paper on the electrolytic separation of metals was discussed, and a paper by Dr. Perkin on the electrolytic analysis of gold. There are also a large number of notes on electrochemical matters, including a particularly full account of recent advances in battery work.

The *U.S. Monthly Weather Review* announces that the Government of the Argentine Republic has determined to give a permanent character to the first-class meteorological and magnetic observatory on the island of Año Nuevo, situated in the vicinity of Staten Island, in latitude 54° 39′ south (Fig. 1). The observatory was established in order that the Republic might cooperate with the International Antarctic Expedition. It is equipped with a complete instrumental outfit, such as is appropriate to a station of the first order, and the results obtained during the International Antarctic Expedition, as also of the observations for the year 1903, will shortly be published. This observatory, as well as the one soon to be established at Bahia Blanca, will form a part of the proposed network of observatories on the Atlantic coast of the Argentine Republic. All correspondence should be addressed Observatory of Año Nuevo, Ministry of the Marine, Buenos Ayres.

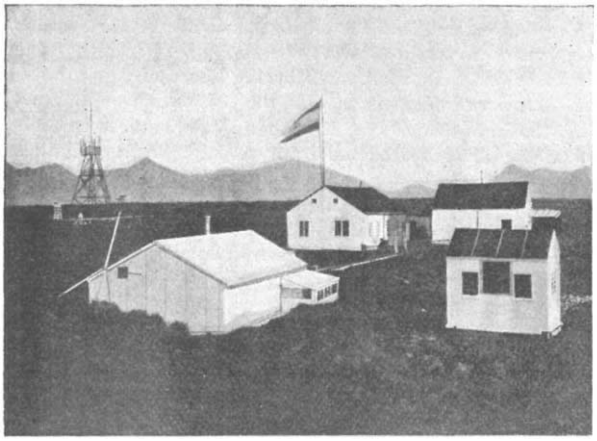

Fig. 1.—Meteorological and Magnetic Observatory of the Argentine Republic on the Island of Año Nuevo.

We have received a copy of the fifth edition of "Jelinek's Psychrometer-Tafeln" (Leipzig). The original name is presumably retained in deference to the former eminent chief of the Austrian Meteorological Service, who first compiled them. They were mostly recomputed by Dr. J. Hann, who also made several important additions to them. The new edition has been revised by Dr. J. M. Pernter, the present chief of the Austrian Service, who has added some elaborate tables for obtaining by inspection the vapour tension from the relative humidity values given by de Saussure's hair-hygrometer. He has also added to the foot of the psychrometric tables the corrections to the ordinary values due to conditions of calm and strong wind. We also find short tables for deducing the vapour tension at various altitudes up to 3000 metres. The tables are naturally much more comprehensive than those usually adopted in this country; they give the values for every tenth of a degree from −30° to 40° of the Centigrade thermometer. A list of the works relating to the dry and wet bulb hygrometer and to the hair-hygrometer is a useful addition to this valuable publication.

In the University of Colorado *Studies*, Dr. Arnold Emch contributes a short note on the *p*-discriminant of ordinary differential equations, and discusses d'Arboux's proof that this discriminant in general represents the cusp-locus of the curves. In a second note the same writer discusses Newton's five types of plane cubics, and shows how to transform them by Steiner's method.

We have had an opportunity of examining and testing an induction coil fitted with the Charpentier-Gaiffe patent platinum interrupter, sent to us by the Medical Supply Association, 228 Gray's Inn Road, and we find its performance fully equal to what is claimed for it. With two four-volt cells the full 10-inch spark was obtained with ease, and there was every indication that the interrupter was capable of working regularly for comparatively long periods without attention. In place of the iron hammer and spring of the old form, there is a light rigid strip of metal, faced with iron, resting by gravity on its lower edge in a shallow groove, and pulled downwards by an adjustable spiral spring. One of the platinums is carried by a flexible strip and remains in contact with a fixed platinum until separated by a blow from the hammer, the rapid motion of which produces a very sudden break. The intensity and frequency of the discharge can be readily varied by the adjustments of the platinums and hammer. The arrangement seems to make the most of a given battery power, and will therefore be specially appreciated by those to whom portability is an important consideration. Coils fitted with the new interrupter are supplied by the Medical Supply Association.

We have received a paper on pulse and rhythm, contributed to the *Popular Science Monthly* by Mary Hallock-Greenewalt. In it the author endeavours to trace a connection between rhythm in music and the beats of the human pulse. In illustration a table is given of the metronome markings of the different movements of twelve of Beethoven's sonatas. Nineteen movements are set to rhythms of 72 or 76 beats per minute, rates exactly equal to those of a normal healthy pulse, and all the other markings range from just a little under 60 to 92, these limits representing the maximum range of pulse-action.

The Johns Hopkins Hospital *Bulletin* for January (vol. xv. No. 154) contains Prof. Osler's address on the occasion of the opening of the new buildings of the medical faculty of the University of Toronto. It is entitled "The Master Word in Medicine," this being *work*. Miss Rowley, M.D., writes on some unusual forms of the malaria parasite.

The United States Public Health and Marine Service has published a brief report by Dr. Howard on the geographical distribution of the yellow fever mosquito. After recording the localities in which the *Stegomyia fasciata* has been met with, he concludes that this species may be expected to occur in all regions the climate of which is not too dry between the parallels of latitude 38° north and 38° south, and in which the sum of the daily mean temperatures above 6° C. or 43° F. amounts to 10,000° C. or 18,000° F. for the year.

The conquest of the Philippines by the United States has been followed by the establishment of a Government laboratory at Manila, which is already doing excellent work. The latest report is one on the subject of rinderpest in cattle, by Dr. James Jobling. No treatment seems to be of any benefit when once an animal has contracted the disease, but several methods of preventive inoculation may be successfully employed and are detailed, *e.g.* the injection of the bile of an animal dead of the disease, or of the blood of a "salted" animal, *i.e.* one that has recovered.

The *Journal of Hygiene* (vol. iv. No. 1) contains several interesting papers. Dr. Bulloch and Mr. Macleod discuss the chemical constitution of the tubercle bacillus. They find that it contains a large percentage of fatty substances, and that the "acid-fast" substance is an alcohol. Dr. Edington writes on a malarial form of South African horse sickness, and Dr. Bashford on immunity. Drs. Boycott and Haldane give a second instalment of their article on ankylostomiasis, and Dr. Durham discusses beri-beri in Malayia and in Christmas Island, which he visited as commissioner of the London School of Tropical Medicine.

IN 1902 Major Ross, at the invitation of the Suez Canal Company, proceeded to Ismailia in order to advise upon a method to rid the town of mosquitoes, and as the result of his advice a series of measures was instituted to accomplish this. These consisted in filling in marsh land, a weekly flushing and cleansing of drainage channels, and, about the houses, petroleum treatment of drains and waste water that does not soak away. Prof. Boyce has recently made a tour of inspection, and reports that as a result of this anti-mosquito campaign, the mosquitoes in Ismailia are no more abundant than in Paris. Malaria also has much diminished, from 1555 cases in 1902 to only 209 cases in 1903. The expenditure to accomplish such results has not been great, 4400*l.* in the initial cleansing operations, and an annual outlay of 720*l.* (Liverpool School of Tropical Medicine, *Mem.* xii.).

IN a paper read before the Royal Institute of British Architects, Prof. Clowes discusses the application of the biological method of sewage treatment to the sewage of Christ's Hospital at Horsham. The plant consists of closed septic tanks into which the sewage flows by gravitation, from whence the effluent is distributed over the surface of coke beds, the liquid remaining in the bed for two hours and then passing away as the purified effluent through drainage channels in the bottom of the beds. No hitch whatever has occurred in the working of the plant, and on one occasion only has smell been detected, the cause being stagnation during a lengthy vacation. Attention is specially directed to this occurrence and to its cause, as it probably explains why similar installations for the treatment of sewage from isolated buildings have become offensive. The solid matter is absolutely disposed of in the septic tank; the number of bacteria in the effluent is 32 per cent. less than in the crude sewage, and the effluent will support fish life.

AN interesting and useful account of the present position and prospects of the Panama Canal is to be found in an illustrated article in the February number of the *National Geographic Magazine,* by the Hon. Wm. H. Burr, of the Isthmian Canal Commission, entitled "The Republic of Panama."

THE December (1903) number of *La Géographie* contains two papers of geological interest: M. Émile Chaix-Du Bois writes on "Le pont des Orelles (Bellegarde, Ain)," giving a careful study, with a number of excellent illustrations, of a remarkable example of the effects of erosive action of running water. MM. Jean Brunhes and Louis Gobet give an account of the "glacier excursion" of the ninth International Geological Congress, which includes a valuable synthetic summary of the observations and theories of Prof. Penck.

DR. R. REINHARD contributes an interesting paper to the *Deutsche Geographische Blätter* on the geographical conditions affecting the positions and development of the large German sea-ports. The port of Bremen is specially dealt with, but the discussion includes Hamburg, Kiel, Lübeck, Stettin, Danzig, and Königsberg. The study of the effects of the introduction of modern methods of transport by land and sea, and of the increased power of modern engineering to overcome local disadvantages, is of considerable geographical value.

AN excellent summary of what is known about the occurrence of gold in Great Britain and Ireland has been written by Mr. J. Malcolm Maclaren (*Trans.* Inst. Mining Engineers, vol. xxv.). The earliest records of the discovery of gold are mentioned, and particulars are given of its occurrence in Cornwall, Devon, Cumberland and elsewhere in England; in Carmarthenshire and in the important district of Merionethshire in Wales; in the Leadhills district and at Kildonan in Scotland; and in several localities in Ireland. The paper is illustrated with sketch maps and numerous pictorial photographic views, and is accompanied by a bibliography of the subject.

DR. G. J. HINDE contributes to the *Journal* of the Royal Microscopical Society (February) an important article on the structure and affinities of the genus Porosphæra. The genus was established for certain small rounded fossils commonly met with in the Chalk, and referred by old authors to Foraminifera, sponges, and Polyzoa. Dr. Hinde shows that the organism is clearly a calcisponge. Several species are figured and described, and their zonal range and distribution in the English Chalk are recorded.

A STRATIGRAPHICAL interest attaches to a short paper by Messrs. Steinmann, Hoek, and von Bistram, who have been travelling together in south-eastern Bolivia (*Centralblatt für Mineralogie,* &c.). A series of red sandstones, gypsiferous clays, limestones, and dolomites, easily taken for Permian or Triassic beds, is shown to contain a marine band near Miraflores, possibly of Jurassic, but more probably of Cretaceous age. This supports the view that the corresponding petroleum beds in Argentina are Cretaceous. Extended traces of glacial phenomena, including enormous moraines of southern Alpine type, are noted in the mountains east of Potosi, down to heights of 4000 metres.

A PAPER by Dr. G. Steinmann on *Tetraploporella Remeši* (*Beiträge zur Paläontologie und Geologie Osterreich-Ungarns und des Orients*, Bd. xv., 1903, p. 45) will be of interest to botanists as well as to palæontologists. This new genus, from the Tithonian, is ascribed to the Dasycladaceæ, with Dactylopora, Diplopora, &c., and resembles a highly calcareous Bornetella. Incidentally, the much discussed genera Cyclocrinus and Receptaculites are considered, and the author doubts if they can be referred to the calcareous algæ.

THE secretary has sent us a copy of the report of the Anti-Bearing-Rein Association for the second half of 1903, from which it appears that no efforts are spared by that body to continue the crusade against inflicting unnecessary discomfort and pain on draught horses of all classes.

THE report for the year 1903 shows that the Yorkshire Naturalists' Union is still in debt (something more than 100*l.*) to its treasurer, a part of the deficit being due to that useful publication, the *Naturalist,* upon which there was a loss of 22*l.* A county of the size and wealth of Yorkshire ought surely to be able to keep the balance of the association on the right side.

THE March number of the *Field Naturalists' Quarterly* contains a long article, by Mr. R. H. Wallace, on the now well-worn subject of the place of "nature-study" in education. Certain of the suggested schemes of work in connection with spring flowers savour, to our thinking, somewhat too much of the methods of the faddist and of the crank. The editor, Dr. G. Leighton, continues his "Reptile Studies," dealing in this instance with the distribution of the British species. Perhaps, however, the most generally interesting article in the issue is one by Mr. W. H. Legge on Ringmer, a favourite Sussex resort of Gilbert White.

WE have received four parts of the *Proceedings* of the U.S. National Museum (Nos. 1361, 1362, 1363, and 1367), all devoted to invertebrates. In the first, Mr. C. F. Baker points out the remarkable fact that while in the United States fleas nearly allied to the human *Pulex irritans* infest such animals as the dog, cat and rabbit, in Mexico and South America species even more nearly related to the former are found on rats, mice, and other small rodents. Hence there is a great probability, in the latter instance, of the communication of serious diseases to human beings by these insects. In No. 1367 Mr. J. E. Benedict points out the probability that the enormously elongated antennulæ of crustaceans of the genera Albunea and Lepidopa, which are furnished with hair-like fringes, are for the purpose of preventing the sand in the water from reaching the mouth.

THE report of the Liverpool Marine Biology Committee for 1903 contains an account of the first year's working of the new biological station at Port Erin, in the Isle of Man. From a financial point of view it is satisfactory to learn that the aquarium is very popular with tourists, and that a substantial sum was received from their gate-money. During the year very successful progress has been made with the experiment of hatching and rearing lobsters, and some remarkable hauls of plankton and the discovery of several rare and interesting animals have been made. Special interest attaches to the hatching of a number of cuttlefish eggs, the commencement of the process taking place after a sojourn of eighty days in the tank. The committee has to deplore the loss of its energetic and talented secretary, Mr. I. C. Thompson, of whom a memoir appears in the report, at the comparatively early age of sixty. A considerable portion of the report is devoted to a pronouncement of the general aims of biological study and the urgent need of further efforts in this direction in Britain. The writer is of opinion that as the older naturalists pass away their place is not taken by younger men, and he deplores that such a state of affairs should exist, even locally.

ACCORDING to Mr. Southwell's report on sealing and whaling for the past year (the twenty-third of the series), published in the February number of the *Zoologist*, the trade in seal skins and seal oil has become specially lucrative on account of the marked rise in prices, and the demand in America. In seal-oil the price has advanced from 18*l*. per tun (some years ago) to 28*l*., while skins which were then worth half a crown now realise 3*s*. 6*d*. each. Sealing will, therefore, undoubtedly be on the increase, but, as Mr. Southwell remarks, this means a black lookout for the seals themselves, and it may be hoped that measures will be taken in time to prevent anything approaching extermination. The year's catch of right whales was small, but several were seen which, owing to the bad weather and heavy ice, could not be pursued. Owing to scarcity of whales and other causes, the Norwegian fin-whale catch has been comparatively only small, the two Ronas Voe companies having captured only 126 head. If it be true that in 1902 the Norwegian fleets accounted for no less than 2500, the scarcity of these whales is no matter for wonder, and ere long they must be well-nigh exterminated. Mr. Southwell alludes to the appearance last summer of a large school of sperm-whales in the seas between Iceland and Norway, of which an account has already appeared in the *Field*.

WE have received a copy of the first part of "Documents Scientifiques de la Mission Saharienne: Mission Foureau-Lamy d'Alger au Congo par Le Tchad," by M. F. Foureau, the leader of the expedition. The work is being published by Messrs. Masson and Co., of Paris, for the French Geographical Society, and is to consist of several parts, forming together a volume of from 800 to 1000 pages. The present fasciculus includes an introduction and two sections, dealing respectively with astronomical and meteorological observations. In his prefatory remarks M. Foureau details the steps which preceded the expedition of 1898, with which the present work is concerned, and gives interesting particulars of nine journeys of exploration in the Sahara he had undertaken before that date. Our notice of the scientific work accomplished must be deferred until all the parts of M. Foureau's volume have been received.

PLATE XI. of the January number of the *Emu*, herewith reproduced on a smaller scale, illustrates the "playground" of one of the species of bower-bird, *Scenopaeus dentirostris* (Fig. 1). The original photograph was taken by Mr. E. M. Cornwall, who states that the area was situated among a tangle of "lawyer-palms, in which a gap had to be made for the camera. The play-ground, which was of considerable size, had been cleared of dead leaves, and was kept scrupulously clean; but at the date of the visit a number of large fresh leaves were strewn over it, apparently as ornaments. "In the morning," according to Mr. Cornwall, "all the birds were noticed low down amongst the scrub, quite close to the play-ground, whilst towards sundown they were invariably perched high up amongst the topmost branches of the trees, but still in the immediate neighbourhood."

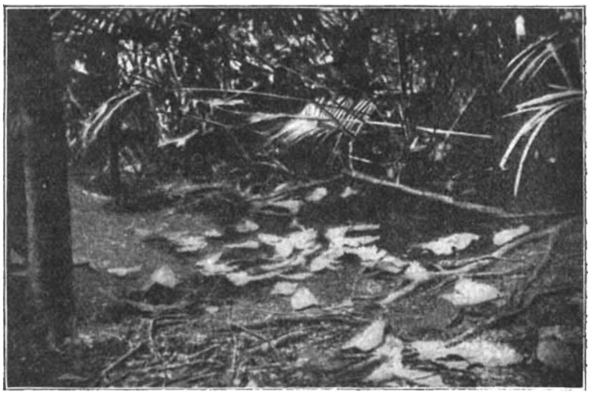

FIG. 1.—"Play-ground" of the Tooth-billed Bower-bird. (From the *Emu*.)

A SOMEWHAT remarkable process of oxidation is described by Dr. Geisow in the *Berichte*. It was noticed some years ago by Blank and Finkenbeiner that when formaldehyde was oxidised in alkaline solution by means of hydrogen peroxide an inflammable gas was liberated which appeared to be hydrogen. An investigation of the course of the oxidation in neutral and acid solution has shown that under these conditions no formic acid is produced, and that the sole products of the oxidation are carbon dioxide and hydrogen, which are produced quantitatively according to the equation $CH_2O_2 + H_2O_2 = CO_2 + H_2O + H_2$.

SOME interest attaches to the preparation of optically active hydrocarbons of the benzene series as described by Messrs. Klages and Sautter in the *Berichte*. A dextrorotatory hexenylbenzene, $C_6H_5.CH : CH.CH(CH_3).C_2H_5$, having $[\alpha]_D + 50°·3$, was prepared by condensing amyl iodide with benzaldehyde by Grignard's magnesium method, and this was reduced to a hexylbenzene,

$$C_6H_5.CH_2.CH_2.CH(CH_3).C_2H_5,$$

which gave $[\alpha]_D + 17°·2$. The latter compound behaves in a normal manner as a homologue of benzene, and it should, therefore, be possible to prepare from it optically active derivatives of all the most important types.

THE additions to the Zoological Society's Gardens during the past week include a Snow Leopard (*Felis uncia*) from Tibet, presented by Major Cox; a Lesser White-nosed Monkey (*Cercopithecus petaurista*) from West Africa, presented by Mrs. Gower; a Mozambique Monkey (*Cercopithecus pygerythrus*) from East Africa, a Yellow Baboon (*Papio cynocephala*) from Africa, a Green Monkey (*Cercopithecus callitrichus*) from West Africa, a Ring-tailed Lemur (*Lemur catta*) from Madagascar, a Common Rat Kangaroo (*Potorous tridactylus*) from Australia, a Lesser Vasa Parrot (*Coracopsis nigra*) from Madagascar, a Blossom-headed Parrakeet (*Palaeornis cyanocephala*), two Larger Tree Ducks (*Dendrocygna major*) from India, deposited; two Himalayan Pheasants (*Lophophorus impeyanus*) from the Himalayas, purchased.

OUR ASTRONOMICAL COLUMN.

A SIX YEAR PERIOD FOR THE POLAR MOTION.—Writing to the *Astronomische Nachrichten* (No. 3932), Mr. H. Kimura, of the International Latitude Station, Mizsusawa, states that he has found that the x and y curves of the polar motion return to the same phase (not amplitude) every six years. This is shown very clearly on the curves accompanying the note.

The latest maximum deviations of the instantaneous pole occurred in 1891 and 1897, whilst the minima deviations were in 1894 and 1900.

The actual x and y curves obtained from the observations may be fairly represented by calculated curves derived from the combinations of two periods of 438 days and 365 days respectively.

During his researches on this subject Mr. Kimura has discovered that there are important systematic variations of purely local character which are as yet unaccounted for.

DOUBLE STAR OBSERVATIONS.—During his absence on leave from the Hong Kong Observatory, Prof. Doberck has observed 280 double stars, mostly taken from the Struve catalogues. The name, coordinates, position angle, and distance of each pair are given in a list published in Nos. 3830 and 3831 of the *Astronomische Nachrichten* as a continuation of the previous list which appeared in Nos. 3860 and 3861. In cases where there are more than two components in any one system, the angles and distances between each pair are given. The observations were made at Copenhagen.

CORRECTIONS TO THE BERLINER JAHRBUCH FUNDAMENTAL CATALOGUE.—In Nos. 3927, 3928 and 3929 of the *Astronomische Nachrichten*, Dr. A. Auwers publishes the results of his discussion of the observations, made between 1750 and 1900, of the 622 stars of the Astronomische Gesellschaft Fundamental Catalogues, which were published in the *Berliner Jahrbuch* in 1883. After a lengthy discussion of the reduction of the observations, Dr. Auwers gives a table showing the total corrections to the places for 1875, and then discusses several multiple systems, for each of which he gives the elements he has computed. In a second table he compares the corrections and the hundred-year proper motions given in his tables with those given by Boss, for each five degrees of declination and right ascension.

COOPERATION IN SOLAR OBSERVATIONS.—In No. 1 (1904) of the *Memorie della Societa degli Spettroscopisti Italiani* Prof. Ricco discusses the modern methods of studying solar phenomena, and points out the vital importance of obtaining as full a record as possible of all the changes which take place in the sun. He also describes the results obtained by Prof. Hale with the spectroheliograph, and directs attention to the important connections which have recently been shown to exist between solar and meteorological changes.

A STUDY OF THE RADIO-ACTIVITY OF CERTAIN MINERALS AND MINERAL WATERS.[1]

PART I.

A CONSIDERABLE number of minerals are known in varying degrees to be radio-active. Lists have been given by M. and Madame Curie ("Thèse présentée à la Faculté des Sciences," Paris, p. 19) and by Sir W. Crookes (Roy. Soc. *Proc.*, vol. lxvi. p. 411). Except in the case of pitchblende, little has been done to determine the nature of the radio-active constituents, or to decide whether any hitherto unknown radio-active body is present.

To obtain complete information on these subjects, the only method available would be completely to analyse the mineral, and examine every precipitate and filtrate for radio-activity. This process is, of course, very tedious, and the results have to be interpreted with care, since traces of radio-active elements may often be carried down in the groups to which they do not properly belong, and thus cause confusion. A much easier method is to heat the crude mineral, and to examine the rate of decay of the emanation which it gives off. Each emanation has a characteristic time constant of decay, and by determining this we can identify it.

The method is, of course, useless for testing the presence or absence of radio-active elements such as uranium[2] which do not give off a characteristic emanation. But the great facility with which it may be applied to a small quantity of material, and the definiteness of the results, are great merits.

In any case when a material suspected to contain radium is obtainable in abundance, it is better to test for the presence of emanation than to look for activity in the solid. For but little of the solid material can be advantageously used in the test. Thick layers give no larger effect than thin ones, since the upper layers absorb the radiation from the lower. But the emanation can be extracted from any desired bulk of material, and the effect proportionately increased. If carbonic acid or any other gas is evolved at the same time in inconvenient quantities, it can be absorbed with a suitable reagent, and the emanation contained in it thereby concentrated.

The present paper gives the results of an examination of certain radio-active materials by this method.

No new emanation has been recognised. The results have in all cases been attributable to thorium and radium.

If any emanation decidedly more permanent than that of radium existed in the evolved gas, the method could not fail to detect it. For in every case the activity of the gas was watched until it became comparable with the very small activity due to the walls of the vessel. If a more durable emanation had been present even in small quantities, the proportion of it present would have increased relatively to the radium emanation, and its presence would have become apparent towards the end by a diminished rate of decay.

Small quantities of an emanation less durable than that of radium might have escaped detection. For they would have been masked by the much greater quantity of the latter.

By measuring the rate of leak due to the accumulated

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[1] By Hon. R. J. Strutt, Fellow of Trinity College, Cambridge. Read before the Royal Society, March 10.

[2] I have found a distinct, though feeble, emanation from recrystallised uranium nitrate, having a rate of decay equal to that of the radium emanation. Whether this is really due to uranium, or to traces of radium, which the uranium still contains, must be left for the present an open question.